

11. Lake Keowee

(Pickens and Oconee County)

1. Problem plant species
Hydrilla
2. Management objectives
Keep hydrilla growth suppressed to minimize its spread within the lake, help prevent its spread to adjacent public waters and minimize adverse impacts to water use activities.
3. Selected control method
Chelated copper *
Fall/winter water level drawdown

*** May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.**
4. Area to which control is to be applied
Chelated copper - 10 acres
Drawdown - entire lake
5. Rate of control agent to be applied
Chelated copper - up to 1 ppm (about 16 gallons per acre)
Drawdown - to the greatest extent possible within project limits.
6. Method of application of control agent
Chelated copper - subsurface injection by airboat with adjuvant.
Drawdown - draw lake down.
7. Timing and sequence of control application
Herbicide application - when plants are actively growing.
Drawdown - drawdown lake from October through February.
8. Other control application specifications
Herbicide application - Herbicide used only upon notification of all local potable water supply authorities and approval by S.C. Department of Health and Environmental Control. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Drawdown - Extent and duration of drawdown is dependent on operational limits of hydroelectric project, Federal regulations, electric demand, precipitation, and inflow.

9. Entity to apply control system

Herbicide application - Commercial applicator or Duke Power Company

Drawdown - Duke Power Company

10. Estimated cost of control operations

Herbicide application - \$2,742

Drawdown - Undetermined

11. Potential sources of funding

Duke Power Company 50%

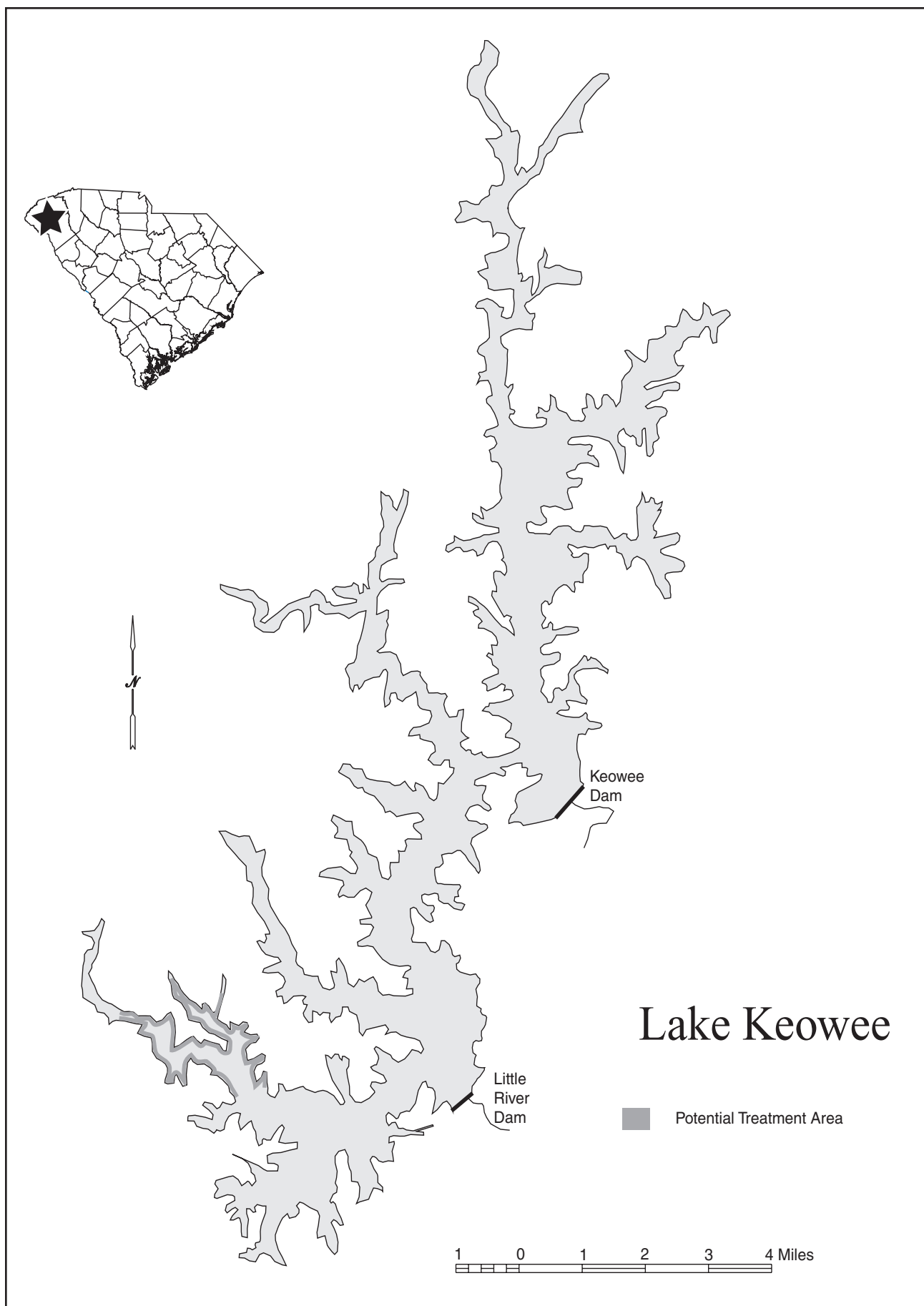
U.S. Army Corps of Engineers 0%

S. C. Department of Natural Resources 50%

(Percentage of match subject to change based on availability of Federal and State funding.)

12. Long term management strategy

- a. Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b. Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c. Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.



12. Lake Marion

(Calhoun, Clarendon, and Sumter Counties)

1. Problem plant species

Hydrilla	Alligatorweed
Brazilian elodea	Fanwort
Water hyacinth	Slender naiad
Water primrose	Giant Cutgrass
Coontail	Filamentous algae (Lyngbya)
Slender Pondweed	

2. Management objectives

- a. Foster a diverse aquatic plant community through selective treatment of nuisance aquatic vegetation (to avoid adverse impacts to existing non-invasive plant species) and the introduction of desirable native plant species.
- b. Manage hydrilla growth throughout the main lake and subimpoundments to minimize its spread within the lake, help prevent its spread to adjacent public waters, and minimize adverse impacts to electric power generation, agricultural irrigation withdrawals, and public use and access.
- c. Reduce water hyacinth populations throughout the lake, especially in the area above the I-95 bridge, to enhance boating, fishing, hunting, and public access.
- d. Reduce giant cutgrass populations throughout the lake, especially in the Santee Cooper Wildlife Management Area and upper lake near Lowfalls landing, to enhance wildlife habitat and hunting opportunities.
- e. Reduce other nuisance aquatic vegetation in priority use areas, such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and subimpoundments.

3. Selected control method

<u>Problem Species</u>	<u>Control Agents</u>
Hydrilla	Aquathol K, Sonar, chelated copper*, Triploid grass carp**
Brazilian elodea, Lyngbya	Reward, chelated copper*, Hydrothol 191*
Water hyacinth	Reward

Fanwort, coontail, slender naiad,
slender pondweed

Aquathol K, Sonar, Hydrothol 191*

Water primrose, alligatorweed,
giant cutgrass

Glyphosate, Habitat, Renovate 3

*** May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.**

**** Triploid grass carp stocked in previous years substantially reduced hydrilla coverage in the main bodies of Lakes Marion and Moultrie during 1996-2005. Consequently, no additional grass carp stockings are planned for these areas in 2006. However, hydrilla populations and potential regrowth will be carefully monitored and in the event that study results and regrowth warrant, the Aquatic Plant Management Council may reconsider the need for additional grass carp.**

4. Area to which control is to be applied

Water hyacinth - Approximately 650 acres throughout lake but mostly in the upper lake area above I-95 bridge.

Hydrilla - Approximately 150 acres in priority areas such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and sub-impoundments.

Giant Cutgrass - Approximately 50 acres along shoreline areas throughout lake system.

Other target species - Approximately 100 acres in priority areas such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas in the main lake and sub-impoundments.

Sub-Impoundments -

a. Dean's Swamp Impoundment, Potato Creek Impoundment, Church Branch Impoundment

Santee Cooper plans to continue transitioning from Hydrilla dominant plant communities to ones dominated by native plant species beneficial to wildlife by use of aquatic herbicides.

5. Rate of control agents to be applied

Aquathol K - 6 to 10 gallons per acre (dependent on water depth)

Reward - 0.5 gallon per acre for floating plants; two gallons per acre for submersed plants

Renovate 3 - 0.5 to 0.75 gallons per acre for emergent species, per label for submersed plants.

Habitat - 1-6 pints per acre

Sonar - 0.075 to 0.15 ppm

Chelated Copper- 1 ppm

Hydrothol 191 - up to 1 ppm

Glyphosate - up to 7.5 pints per acre.

Sonar Q, Sonar PR - up to 20 ppb(approx 5.4 pounds/acre)

Triploid grass carp - (See ** footnote in Section 3 above)

6. Method of application of control agents

Aquathol K, chelated copper, Sonar, Hydrothol 191 - subsurface application by airboat or surface application by helicopter with adjuvant.

Reward - (water hyacinths) spray on surface of foliage using handgun from airboat or by helicopter with appropriate surfactant;(submersed plants) subsurface application with adjuvant .

Renovate 3, Glyphosate, Habitat - spray on surface of foliage with appropriate surfactant.

Triploid grass carp - (See ** footnote in Section 3 above)

7. Timing and sequence of control application

Herbicide applications -

All herbicide applications to be applied when plants are actively growing. Water hyacinth treatments should be initiated in early spring when plant growth begins and continued regularly during the year as needed.

Triploid grass carp - (See ** footnote in Section 3 above)

8. Other control application specifications

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Water hyacinth treatments should be considered a high priority to minimize spread to other areas of the lake system. Treatments should be conducted

wherever the plants occur and access by boat is feasible. Frequent treatments in this area will be necessary to meet management objectives.

9. Entity to apply control agents

S.C. Public Service Authority and/or commercial applicator.

10. Estimated cost of control operations

\$125,000

Note: The budgeted amount is based on aquatic plant coverage and treatment needs from previous years. Actual expenditures will depend on the extent of noxious aquatic plant growth in 2006.

11. Potential sources of funding

S.C. Public Service Authority 50%

U.S. Army Corps of Engineers 0%

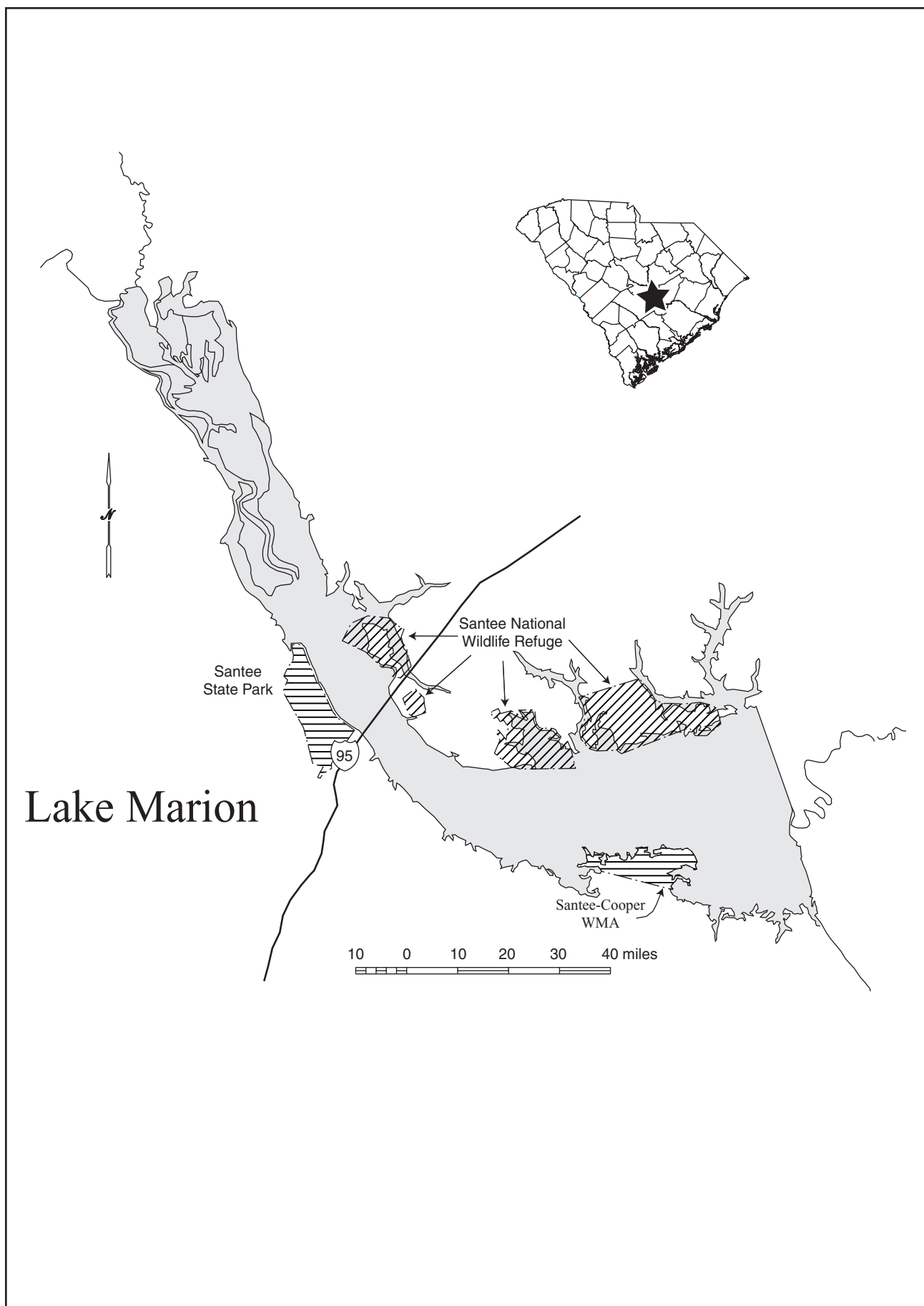
S. C. Department of Natural Resources 50%

(Percentage of match subject to change based on availability of Federal and State funding.)

12. Long term management strategy

- a. Support the management goals established by the DNR and Santee Cooper (Appendix E) which attempts to achieve a diverse assemblage of native aquatic vegetation in 10% of the total surface area of the lake and to effectively control non-native invasive species.
- b. Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- c. A long-term integrated management strategy has been implemented to control hydrilla. Triploid grass carp have been stocked to control hydrilla growth lake-wide and approved aquatic herbicides are used to control localized growth in priority use areas. Future plans include periodic stocking of grass carp to maintain the population at a level that is sufficient to maintain control of hydrilla but to minimize impacts on desirable native plant populations.
- d. Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.

- e. Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- f. Periodically revise the management strategy and specific control sites as new environmental data, management agents and techniques, and public use patterns become available.



13. Lake Moultrie

(Berkeley County)

1. Problem plant species

Hydrilla	Slender naiad
Brazilian elodea	Watermilfoil
Water primrose	Alligatorweed
Fanwort	Water hyacinth
Giant Cutgrass	

2. Management objectives

- a. Foster a diverse aquatic plant community through selective treatment of nuisance aquatic vegetation (to avoid adverse impacts to existing non-invasive plant species) and the introduction of desirable native plant species.
- b. Manage hydrilla growth throughout the main lake and subimpoundments to minimize its spread within the lake, help prevent its spread to adjacent public waters, and minimize adverse impacts to electric power generation, agricultural irrigation withdrawals, and public use and access.
- c. Reduce water hyacinth populations throughout the lake to enhance boating, fishing, hunting, and public access.
- d. Reduce giant cutgrass populations throughout the lake to enhance wildlife habitat and hunting opportunities.
- e. Reduce other nuisance aquatic vegetation in priority use areas, such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas.

3. Selected control method

<u>Problem Species</u>	<u>Control Agents</u>
Hydrilla	Aquathol K, chelated copper*, Sonar, Triploid grass carp**
Brazilian elodea	Reward, chelated copper*, Sonar
Water hyacinth	Reward
Fanwort, slender naiad, watermilfoil	Aquathol K, Sonar, Hydrothol 191*
Water primrose, alligatorweed, giant cutgrass	Glyphosate, Habitat, Renovate 3

*** May be toxic to fish at recommended treatment rates; however, precautions will be implemented to minimize the risk of fish kills.**

**** Triploid grass carp stocked in previous years substantially reduced hydrilla coverage in the main bodies of Lakes Marion and Moultrie during 1996-2005. Consequently, no additional grass carp stockings are planned for these areas in 2006. However, hydrilla populations and potential regrowth will be carefully monitored and in the event that study results and regrowth warrant, the Aquatic Plant Management Council may reconsider the need for additional grass carp.**

4. Area to which control is to be applied

Hydrilla, fanwort, watermilfoil - Approximately 10 acres in priority areas such as electric power generation facilities, public and commercial access sites (boat ramps, piers, swimming areas, marinas) and residential shoreline areas.

Giant cutgrass, water primrose, alligatorweed - Approximately 90 acres along shoreline areas throughout the lake.

5. Rate of control agents to be applied

Aquathol K - 6 to 10 gallons per acre (dependent on water depth)

Reward - 0.5 gallon per acre for floating plants; two gallons per acre for submersed plants

Renovate 3 - 0.5 to 0.75 gallons per acre for emergent species, per label for submersed plants.

Habitat - 1-6 pints per acre

Sonar - 0.075 to 0.15 ppm in treatment area

Chelated copper - 1 ppm

Hydrothol 191 - up to 1 ppm

Glyphosate- up to 7.5 pints per acre.

Other approved aquatic herbicides - as per label instructions.

Triploid grass carp - (See ** footnote in Section 3 above)

6. Method of application of control agents

Aquathol K, chelated copper, Sonar, Hydrothol 191 - subsurface application by airboat or surface application by helicopter with adjuvant.

Reward - (water hyacinths) spray on surface of foliage using handgun from airboat or by helicopter with appropriate surfactant;(submersed plants) subsurface application with adjuvant .

Glyphosate, Habitat - spray on surface of foliage with appropriate surfactant.

Renovate 3, Glyphosate, Habitat - spray on surface of foliage with appropriate surfactant.

Triploid grass carp - (See ** footnote in Section 3 above)

7. Timing and sequence of control application

All herbicides to be applied when plants are actively growing.

If needed, aerial treatment of hydrilla adjacent to the Rediversion Canal entrance should be performed as early as possible to prevent excessive plant growth and avoid impacts to the St. Stephen Hydropower Plant.

Triploid grass carp - (See ** footnote in Section 3 above)

8. Other control application specifications

Herbicide used only upon approval by the S.C. Department of Health and Environmental Control.

Treatment of the control area is to be conducted in a manner that will not significantly degrade water quality. This may require that only a portion of the control area be treated at any one time.

Treatment of lake, especially near the Rediversion Canal, should be coordinated with hydropower production to avoid excessive flows and maximize herbicide contact time.

9. Entity to apply control agent

S.C. Public Service Authority and/or commercial applicator

10. Estimated cost of control operations

\$15,000

Note: The budgeted amount is based on aquatic plant coverage and treatment needs from previous years. Actual expenditures will depend on the extent of noxious aquatic plant growth in 2006.

11. Potential sources of funding

S.C. Public Service Authority 50%

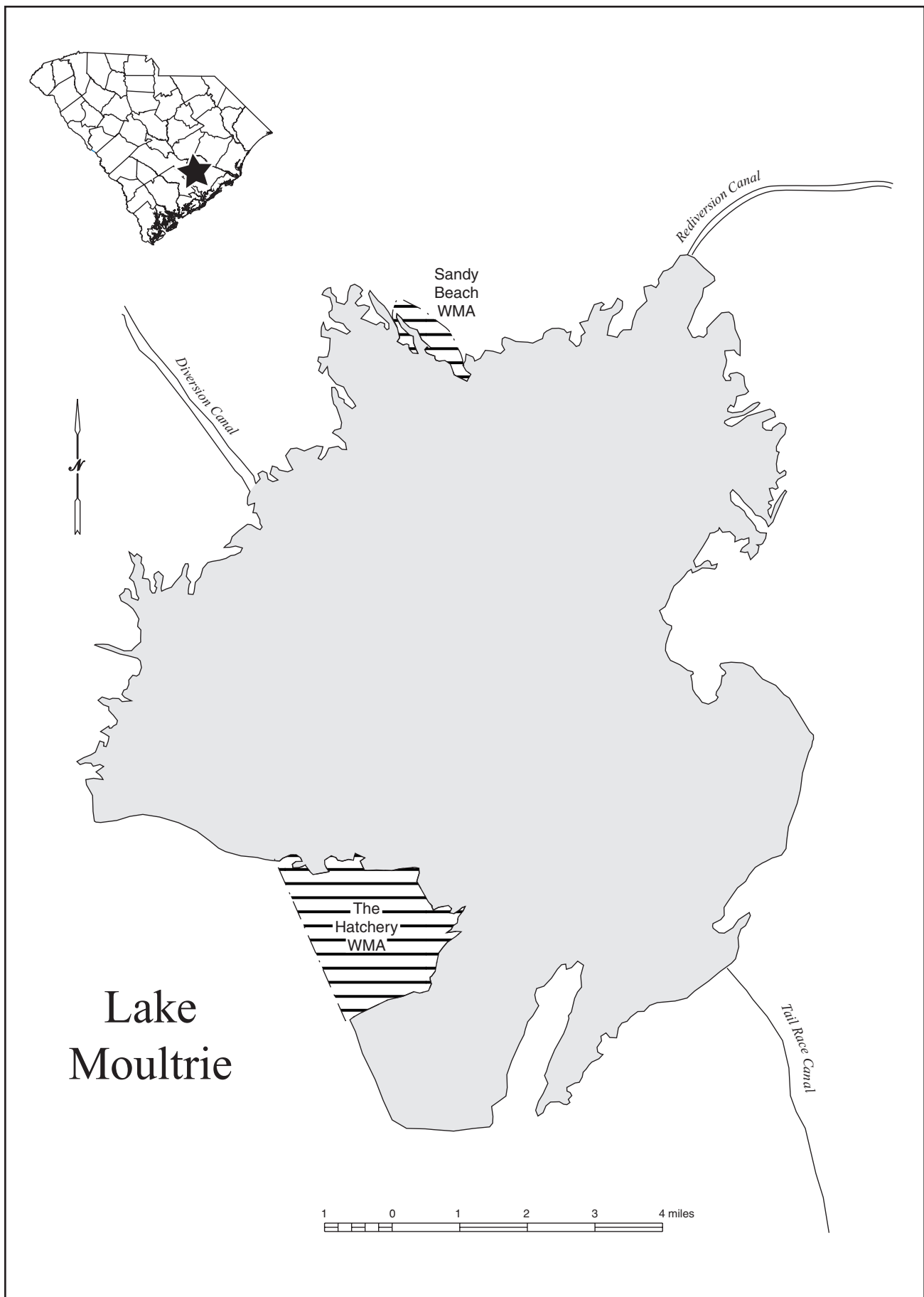
U.S. Army Corps of Engineers 0%

S. C. Department of Natural Resources 50%

(Percentage of match subject to change based on availability of Federal and State funding.)

12. Long term management strategy

- a. Support the management goals established by the DNR and Santee Cooper (Appendix E) which attempts to achieve a diverse assemblage of native aquatic vegetation in 10% of the total surface area of the lake and to effectively control non-native invasive species.
- b. Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- c. A long-term integrated management strategy has been implemented to control hydrilla. Triploid grass carp have been stocked to control hydrilla growth lake-wide and approved aquatic herbicides are used to control localized growth in priority use areas. Future plans include periodic stocking of grass carp to maintain the population at a level that is sufficient to maintain control of hydrilla but to minimize impacts on desirable native plant populations.
- d. Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- e. Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- f. Periodically revise the management strategy and specific control sites as new environmental data, management agents and techniques, and public use patterns become available.



14. Lake Murray

(Lexington, Newberry, Richland and Saluda Counties)

1. Problem plant species

Hydrilla

Illinois pondweed

Water Primrose

2. Management objectives

- a. Maintain reduced hydrilla and Illinois pondweed growth throughout the lake to minimize its spread within the lake, help prevent its spread to adjacent public waters, and minimize adverse impacts to drinking water withdrawals and public use and access.
- b. Monitor water primrose growth and consider control options if impacts are greater than anticipated.
- c. Maintain diverse aquatic plant community through selective application of control methods and introduction of desirable native plant species.

3. Selected control method

- a. Triploid grass carp stocked in 2003 substantially reduced hydrilla coverage in Lake Murray during 2003-2005. Consequently, no additional grass carp stockings are planned for these areas in 2006. However, hydrilla populations and potential regrowth will be carefully monitored and in the event that survey results and regrowth warrant, the Aquatic Plant Management Council may reconsider the need for additional grass carp.
- b. Mechanical harvester – short-term control in selected areas to provide public access and clear areas around municipal water intakes.
- c. Aquatic herbicides - short-term control in selected areas to provide public access and clear areas around municipal water intakes.

Problem Species

Hydrilla

Water primrose

Control Agents

Chelated copper(Nautique)

Renovate 3*

*All herbicides which would be effective on this species have an irrigation restriction. All treatments would require coordination and notification of property owners.

4. Area to which control is to be applied

- a. If needed, release triploid grass carp in areas of the lake with greatest hydrilla growth.

- b. Use mechanical harvesters or aquatic herbicides to provide immediate short-term control at high priority public access points, such as boat ramps and park sites, and municipal water intakes.
- 5. Rate of control agent to be applied
 - a. If hydrilla acreage in 2006 warrants, additional grass carp may be stocked at the rate of 15 fish per vegetated acre following Council approval.
 - b. Harvest acreage as needed to provide public use, access and clear areas around municipal water intakes.
 - c. Apply aquatic herbicides to provide immediate short-term control at high priority public access points and municipal water intakes.
Chelated copper - up to 1 ppm
- 6. Method of application of control agent
 - a. Triploid grass carp - See section 3 above.
 - b. Use mechanical harvester as designed.
 - c. All agents to be applied when plants are actively growing.
- 7. Timing and sequence of control application
 - a. If hydrilla acreage in 2006 warrants, additional grass carp may be stocked following Council approval.
 - b. Harvest aquatic growth as it becomes problematic; multiple applications are likely.
 - c. Apply herbicides to aquatic vegetation as it becomes problematic.
- 8. Other control application specifications
 - a. If needed, all sterile grass carp will be a minimum of 12 inches in length. All sterile grass carp shipments for Lake Murray will be examined by the SCDNR for sterility, size, and condition at the Campbell Fish Hatchery in Columbia prior to stocking in the lake.
 - b. Harvested vegetation must be removed from the lake and deposited on high ground. The harvesting process must minimize adverse impacts to fish.
 - c. Control by Residential/Commercial Interests:

This plan is designed to provide relief from noxious aquatic vegetation for the public at large. Private entities such as lake-front residents and commercial interests may have site specific concerns not addressed immediately by the use of grass carp or mechanical harvesters at public ac-

cess areas. **Residential and commercial interests may remove nuisance aquatic vegetation manually or by use of mechanical harvesting devices.** Of the three major control methods the following conditions apply.

1) Mechanical harvesters – Commercial aquatic plant harvesting services may be hired to remove hydrilla and Illinois pondweed from areas adjacent to residential and commercial property after notification of SCE&G. Harvesting precautions as stated in item b. above must be adhered to.

2) Aquatic herbicides – SCE&G opposes regular or general application of herbicides in Lake Murray, therefore, aquatic herbicides may not be applied in the lake by lakefront property owners.

3) Sterile grass carp - A sufficient number of grass carp are being stocked by SCDNR to control nuisance aquatic vegetation. Stocking additional grass carp in Lake Murray without written consent by the SCDNR is prohibited.

9. Entity to apply control agent

- a. Triploid grass carp - Commercial supplier with supervision by the SCDNR.
- b. Mechanical harvester – Commercial harvester under supervision of SCE&G at park sites and public boat ramps; private marina operators to contract for application at commercial boat ramps.
- c. Aquatic herbicides - Commercial applicator under supervision by the SCDNR.

10. Estimated cost of control operations

- a. Triploid grass carp - None anticipated
- b. Mechanical harvester - \$500-1000/acre
- c. Aquatic herbicides - \$275 / acre

11. Potential sources of funding

- a. Triploid grass carp if needed.
S.C. Electric and Gas Company, Lexington and Richland Counties 50%
U.S. Army Corps of Engineers 0%
S. C. Department of Natural Resources 50%
- b. Mechanical harvester
S.C. Electric and Gas Company, Commercial marina operators, and residential property owners.

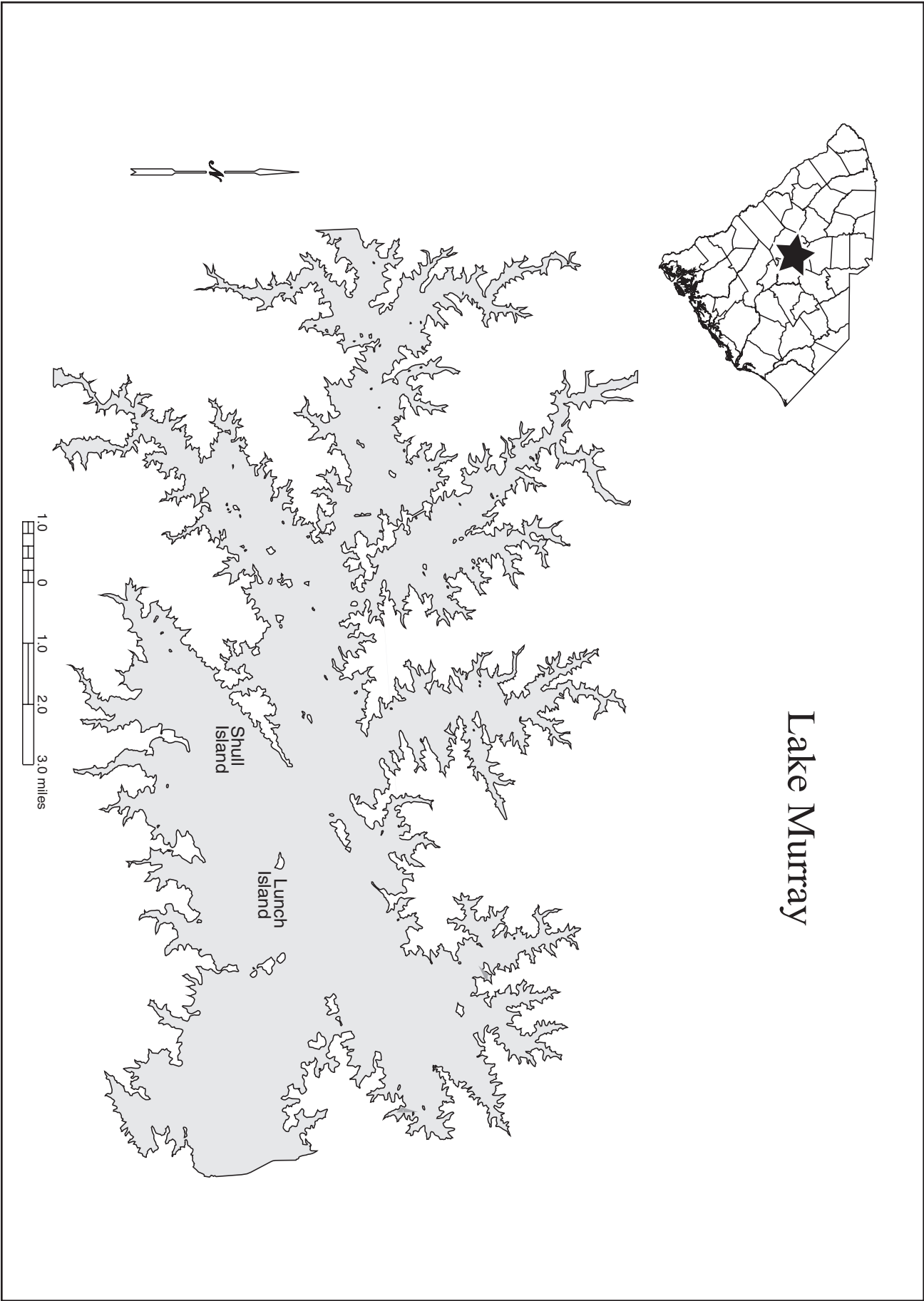
c Aquatic herbicides

S.C. Electric and Gas Company, Lexington and Richland Counties 50%
U.S. Army Corps of Engineers 0%
S. C. Department of Natural Resources 50%

(Percentage of match subject to change based on availability of Federal and State funding.)

12. Long term management strategy

- a. Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
- b. Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
- c. Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.
- d. Improve public awareness and understanding of aquatic plant management activities through the maintenance of the Lake Murray Aquatic Plant Management web site. The web site includes up-to-date information on annual management plans, dates and locations of current and historical control operations, locations of habitat enhancement activities, and other pertinent information.
- e. Periodically revise the management strategy and specific control sites as new environmental data and control agents and techniques become available, and public use patterns change.
- f. Water primrose - Water primrose, a shoreline plant, became problematic in the upper portion of the lake last year. The two-year drawdown exposed a lot of unvegetated shoreline where water primrose quickly spread and re-established at the 345-348 foot contour level. While this plant can be invasive and cause localized problems, it has been in the lake for decades and is typically not a threat to general public access and use of the waterway. Based on past experience, it is expected that most of the plants that are rooted in deep water will not survive after the lake level returns to full pool. Therefore, there are no plans to control its growth this year. However, the SCDNR and SCE&G will monitor water primrose growth and consider control options if impacts are greater than anticipated.



Lake Murray

15. Lake Wateree

(Fairfield, Kershaw and Lancaster Counties)

1. Problem plant species
Hydrilla
2. Management objective
Keep hydrilla growth suppressed to prevent its spread within the lake, help prevent its spread to adjacent public water, and minimize adverse impacts to water use activities.
3. Selected control method
Aquathol K
Fall/winter water level drawdown
4. Area to which control is to be applied
Aquathol K - At least 2 acres in cove near Lakeside Marina.
Drawdown - Entire lake
5. Rate of control agent to be applied
Aquathol K - 4 ppm (about 8 gallons per acre depending on depth)
Drawdown - To the greatest extent possible within project limits.
6. Method of application of control agent
Aquathol K - Subsurface injection from airboat with adjuvant.
Drawdown - Draw lake down
7. Timing and sequence of control application
Aquathol K - 2 acres treated twice in June and again in fall of year.
Drawdown - Drawdown lake from October through February.
8. Other control application specifications
Aquathol K - Herbicide used only upon notification of all local potable water supply authorities and approval by S.C. Department of Health and Environmental Control. Treatment of control area will be conducted in a manner that will not significantly degrade water quality.

Drawdown - Extent and duration of drawdown is dependent on operational limits of hydroelectric project, Federal regulations, electric demand, precipitation, and inflow.

9. Entity to apply control agent
 - Herbicide application - Commercial applicator or Duke Power Company
 - Drawdown - Duke Power Company
10. Estimated cost of control operations
 - Herbicide application - \$2,880
 - Drawdown - Undetermined
11. Potential sources of funding
 - Duke Power Company 50%
 - U.S. Army Corps of Engineers 0%
 - S. C. Department of Natural Resources 50%

(Percentage of match subject to change based on availability of Federal and State funding.)
12. Long term management strategy
 - a. Manage the distribution and abundance of nuisance aquatic plant populations at levels that minimize adverse impacts to water use activities and the environment through the use of federal and state approved control methods.
 - b. Maintain or enhance native aquatic plant populations at levels beneficial to water use, water quality, and fish and wildlife populations through selective control of nuisance plant populations where feasible, introduction of native plant species where appropriate, and public education of the benefits of aquatic vegetation in general.
 - c. Seek to prevent further introduction and distribution of problem species through public education, posting signs at boat ramps, regular surveys of the water body, and enforcement of existing laws and regulations.

